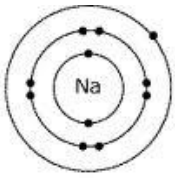
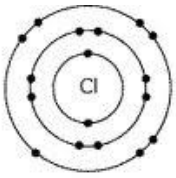
Chapter 5.5

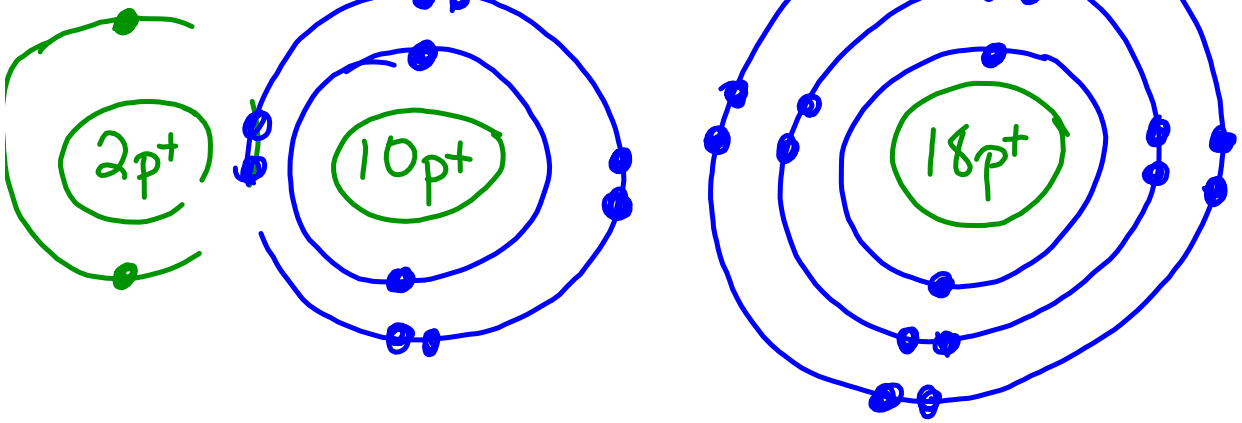
Bohr Diagrams:

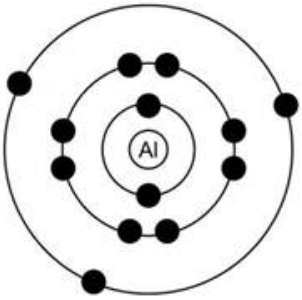




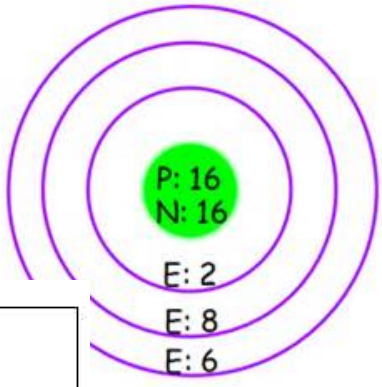
The Noble Gases all have full outer orbits
This means that they are stable.

$^{5}_{2}He$ $^{22}_{10}Ne$ $^{43}_{18}Ar$

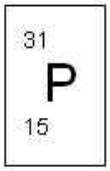


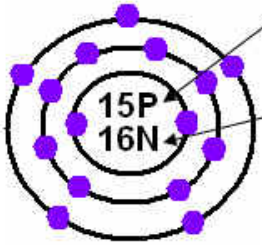


Bohr Diagram for Sulfur



Example: phosphorus





# of Protons = atomic #
# of Protons = 15

# of Neutrons = mass # - atomic #
# of Neutrons = 31 – 15
# of Neutrons = 16

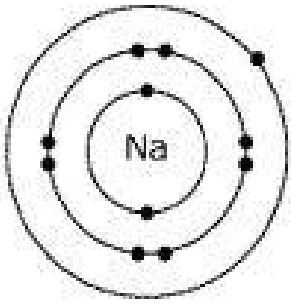
Stability of Atoms

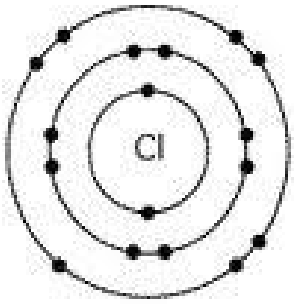
•Atoms "*like*" to have their outermost orbit full in order to become stable

•In order to achieve this, an atom will either lose or gain valence electrons

•**Valence electrons**:
Electrons in outermost orbit of atom, they have the most energy, involved in bonding

How many VALENCE electrons?





Trends:

•Alkali Metals (group 1) have 1 valence electron

•Alkaline Earth Metals (group 2) have 2 valence electrons

•Halogens (group 17) have 7 valence electrons

•Noble Gases (group 18) have 8 valence electr ons

Directions: How to draw a Bohr diagram

1. Draw the nucleus.

2. Look up the atomic number. Write this number in the nucleus. atomic number=number of protons

3. Use the mass number to figure out the neutrons. Write this in the nucleus.

4. Draw rings representing orbits based on rows in the periodic table.

(#electrons=#protons for a neutral atom)

1st orbit=max of 2 e
2nd orbit=max of 8 e
3rd orbit=max of 8 e
4th orbit=max of 18 e

3 Electron Energy-Level Diagrams for Atoms

3

Atoms

high 18 8 8 2 low